

Replication Package for: “Firm Dynamics, Monopsony, and Aggregate Productivity Differences”

Overview

The code in this replication package uses data from four data sources to compute wage markdowns and generate the stylized facts presented in Section 2 of the paper, and to estimate and solve model presented in Section 3, to replicate the baseline and counterfactual results from Sections 4, 5, and 6. The code in this replication package is written in Stata and Julia. The replicator should expect the code to run in approximately 4 hours.

Data Availability and Provenance Statements

Statement about Rights

- ☒ I certify that the author(s) of the manuscript have legitimate access to and permission to use the data used in this manuscript.
- ☒ I certify that the author(s) of the manuscript have documented permission to redistribute/publish the data contained within this replication package. Appropriate permission are documented in the LICENSE.txt file.

Summary of Availability

- ☐ All data **are** publicly available.
- ☒ Some data **cannot be made** publicly available.
- ☐ **No data can be made** publicly available.

Details on each Data Source

Data from four sources are used in the paper. The table below summarizes the information and their availability within the package. The paragraphs below expand the information.

| Data Name | Provided | Citation |
|-----------------------------------|----------|------------------------|
| GDP per capita, PPP (intl \$) | TRUE | World Bank (2024) |
| Penn World Tables | TRUE | Feenstra et al. (2015) |
| Innovating Enterprises (Eurostat) | TRUE | Eurostat (2022) |
| World Bank Enterprise Surveys | FALSE | World Bank (2025) |

GDP per capita, PPP (constant 2017 international \$)

Data on GDP per capita, PPP (constant 2017 international \$) were downloaded from the World Bank World Development indicators (World Bank, 2024). The

data can be downloaded from <https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.KD>. A copy of the raw data is provided as part of this archive.

Datafile: `Data/dta/API_NY.GDP.PCAP.PP.KD_DS2_en_excel_v2_1269.xls` (raw) and `Data/dta/gdpxc2017.dta` (re-shaped).

Penn World Tables

TFP time series were downloaded from the Penn World Tables (Feenstra et al., 2015). The data can be downloaded from <https://www.rug.nl/ggdc/productivity/pwt/pwt-releases/pwt1001>. A copy of the raw data is provided as part of this archive.

Datafile: `Data/dta/pwt1001.dta`.

Eurostat data on innovating enterprises

Data on the counts of total enterprises by innovation status for countries in the European Union plus Turkey and Norway were downloaded from Eurostat (Eurostat, 2022). The data can be downloaded from https://ec.europa.eu/eurostat/databrowser/view/inn_cis13_bas_ip/default. A copy of the raw data is provided as part of this archive.

Datafile: `Data/dta/inn_cis13_bas_ip__custom_17698651_page_spreadsheet.xlsx`.

World Bank Enterprise Surveys

The paper uses data from the World Bank Enterprise Surveys (World Bank, 2025). Data is subject to a redistribution restriction, but can be freely downloaded from <https://login.enterprisesurveys.org/content/sites/financeandprivatesector/en/signin.html>. Free registration and agreement of data use conditions is required to access the data. Once access is granted, navigate to “Combined Data” and download the file with a name beginning with “StandardizedNew-2006-” and the file with a name beginning with “Firm-Level-TFP-Estimates-”. Save the dta files in `Data/dta/` with the names `New_Comprehensive_March_1_2024.dta` and `Firm Level TFP Estimates and Factor Ratios_March_1_2024.dta`, respectively.¹

Datafile: `Data/dta/New_Comprehensive_March_1_2024.dta` (not provided) and `Data/dta/Firm Level TFP Estimates and Factor Ratios_March_1_2024.dta` (not provided).

Computational requirements

Software Requirements

- Stata (code was last run with version 17)
 - `ereplace` (as of 2025-12-01)

¹WBES data is frequently updated and previous versions are not publicly archived for download.

- `exbsample` (as of 2025-12-01)
- Both can be installed via “`ssc install`”
- Julia 1.10.0
 - `Parameters` 0.12.3
 - `TickTock` 1.3.0
 - `Distributions` 0.25.107
 - `Optim` 1.8.0
 - `StatsBase` 0.34.3
 - `DataFrames` 1.6.1
 - `CSV` 0.10.13
 - `Tables` 1.11.1
 - All can be installed via “`import Pkg; Pkg.Install("NAME")`”

Controlled Randomness

- ☒ Random seed is set at line 18 of program `Model/main/model_solve.jl`
- ☐ No Pseudo random generator is used in the analysis described here.

Memory, Runtime, Storage Requirements

Summary Approximate time needed to reproduce the analyses on a standard (2025) desktop machine:

- ☐ <10 minutes
- ☐ 10-60 minutes
- ☐ 1-2 hours
- ☒ 2-8 hours
- ☐ 8-24 hours
- ☐ 1-3 days
- ☐ 3-14 days
- ☐ > 14 days

Approximate storage space needed:

- ☐ < 25 MBytes
- ☐ 25 MB - 250 MB
- ☒ 250 MB - 2 GB
- ☐ 2 GB - 25 GB
- ☐ 25 GB - 250 GB
- ☐ > 250 GB
- ☐ Not feasible to run on a desktop machine, as described below.

Details The code was last run on a **2023 Mac Mini M2, with MacOS 14.5 and 8GB of RAM and 40GB of free storage.**

Description of programs/code

- Programs in `Data/do` will perform all empirical analysis in the paper and appendices, and make the targeted moments for the model estimation. Run `main_local.do`, then `main_local_tfp.do`, then `main_eurostat.do`.
- Programs in `Model/` will run the model estimation and counterfactual exercises for all results in the paper and appendices. For each subfolder, run `model_solve.jl`.

Instructions to Replicators

- Run the three do-files under `Data/do/` to perform all empirical analysis.
- All empirical analysis output are saved under `Data/out/`.
- For each folder within `Model/`:
 - Run the julia program with name beginning with `model_solve`.
 - Run the Stata do-files present in the subfolders `estim_out` and `counter_out`. These will generate all the model-based outputs from the paper and appendices.

References

- Eurostat (2022). Community innovation survey (cis 2022) — inn_cis13. https://ec.europa.eu/eurostat/cache/metadata/en/inn_cis13_esms.htm. Accessed: March 1, 2024.
- Feenstra, R. C., Inklaar, R., and Timmer, M. P. (2015). The next generation of the penn world table. *American Economic Review*, 105(10):3150–3182.
- World Bank (2024). World development indicators. <https://databank.worldbank.org/source/world-development-indicators>. Accessed: March 2024.
- World Bank (2025). World bank enterprise surveys. <https://www.enterprisesurveys.org>. Accessed: March 2024.